Biomarkers may help ID treatment of acute kidney injury

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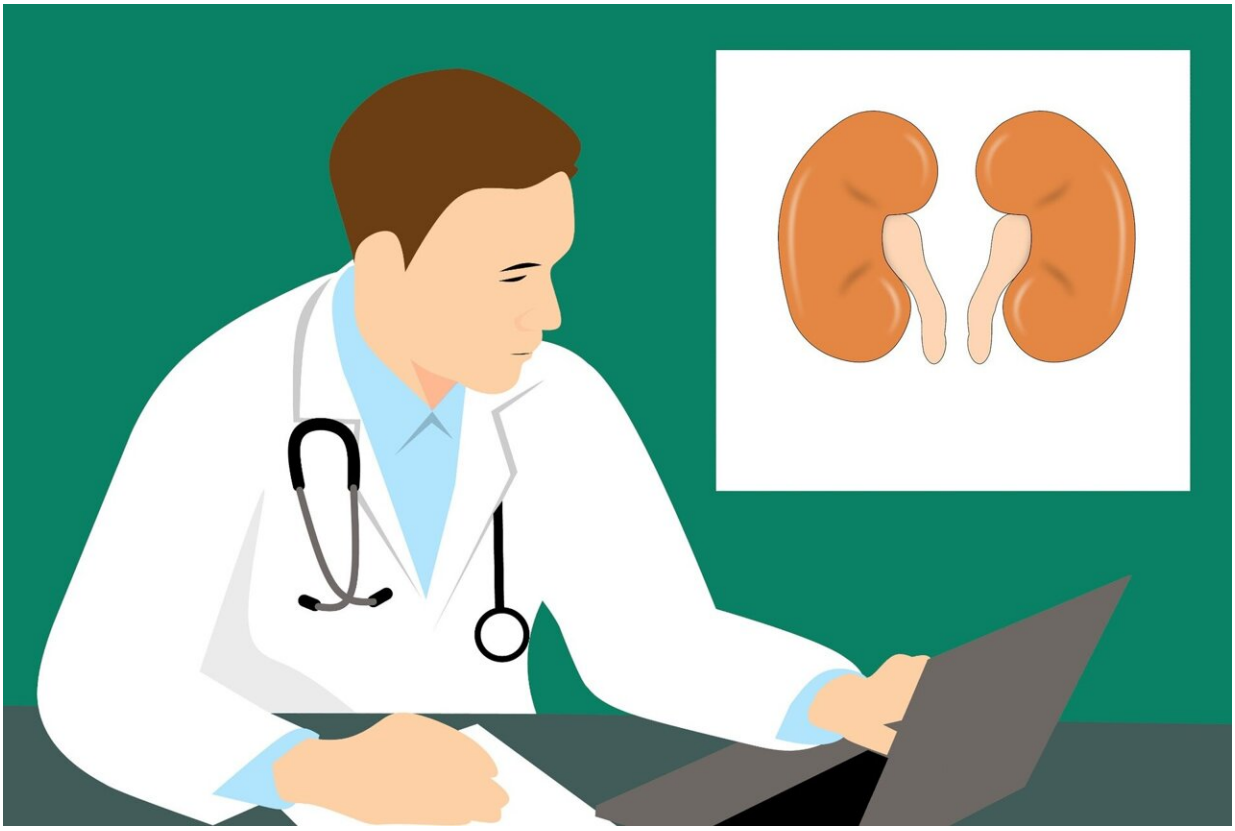

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Hospital inpatients who develop an acute kidney injury (AKI) generally fare poorly after being discharged, and have few options for effective treatment.

A UW Medicine-led study published recently in *American Journal of Kidney Diseases* suggests that new tests might improve this narrative.

In the study, "about 30% of the patients that came into the hospital developed AKI, which means in a matter of hours or days, their kidneys might be failing because of reaction to drugs or contracting sepsis," said lead author Dr. Pavan Bhatraju, an assistant professor of pulmonary and critical care medicine at the University of Washington School of Medicine.

Causes of AKI vary. For instance, sepsis, medication and inadequate blood supply in someone who is undergoing cardiac bypass are all potential causes of kidney injury. It's also the case that, within the kidneys, different cell types can be injured in the process of AKI, said Dr. Jonathan Himmelfarb, a professor of nephrology at the UW School of Medicine and the study's senior author.

"The way that we diagnose acute kidney injury today relies on a simple blood test of kidney function or a change in urine output," Himmelfarb said. "These relatively crude diagnostic tools don't detect the specific cause of injury or predict which individuals will be more likely to respond to a treatment or recover kidney function."

Unfortunately, effective medical therapies do not exist for this population of patients, Bhatraju said. In their paper, the investigators proposed a way to classify subpopulations of AKI patients with the aim of identifying therapies specific patient populations.

In much the same way that distinct biomarkers inform treatments of subgroups of patients with cancer or asthma, so, too, could blood- and urine-based biomarkers help identify subgroups of patients with AKI, leading to new ideas for treatments, the authors said.

In the study, the researchers retrospectively analyzed 769 patients with AKI and 769 without the condition, and followed them for five years after hospital discharge. The researchers found two molecularly distinct AKI subgroups, or sub-phenotypes, that were associated with differing risk profiles and long-term outcomes.

Patients in one group had higher rates of congestive heart failure, while another group had higher rates of chronic kidney disease and sepsis, Bhatraju said. The patients in the second group also had a 40% higher risk for major adverse kidney events five years later, compared with the first group, he said.

Interestingly, Bhatraju added, age, sex, diabetes rate or major surgical procedure as the cause of AKI was not different across AKI subgroups. This finding suggests that commonly measured clinical factors may not predict the AKI subgroups, and that identification requires measurement of blood and urine biomarkers, he said.

"We're attempting to better understand the clinical factors and molecular drivers of acute kidney injury so that, in the long run, we can better treat the different ways that people experience this disease process," Himmelfarb added. "We want to better understand the individual characteristics of people who get acute kidney injury so we can establish common characteristics of subgroup populations of these patients to know whose risk is relatively higher or lower, and work toward treatments specific to their needs."

"Our paper is one step on the path to tailoring clinical trials of new therapies to the people who are most likely to respond to those therapies," Himmelfarb said.

More information: Pavan K. Bhatraju et al, Integrated Analysis of Blood and Urine Biomarkers to Identify Acute Kidney Injury

Subphenotypes and Associations With Long-term Outcomes, *American Journal of Kidney Diseases* (2023). DOI: 10.1053/j.ajkd.2023.01.449